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ABSTRACT

IT IS SUGGESTED THAT SINCE NO ONE TEACHER CAN HAVE COMPLETE KNOWLEDGE OF SCIENCE AND ITS SEPARATE DISCIPLINES, NOR OF SCIENCE AS A METHOD, TEAM TEACHING IS AN INNOVATIVE APPROACH THAT MAY OFFER AT LEAST A PARTIAL SOLUTION TO THE PROBLEMS OF TEACHING SCIENCE. TEAM TEACHING CAN BE PRACTICED IN EITHER SELF-CONTAINED OR DEPARTMENTALIZED CLASSROOMS, WHETHER GROUPING IS HOMOGENEOUS OR HETEROGENEOUS. THE BASIC PREREQUISITE FOR THE SUCCESSFUL INITIATION OF TEAM TEACHING IS NOT CLASSROOM ORGANIZATION, BUT A REALIZATION BY THE TEACHERS THAT THE PRESENT PROGRAM IS NOT THE BEST POSSIBLE. A TEACHING TEAM MAY CONSIST OF A VARIETY OF PERSONNEL, FROM TEACHERS' AIDES TO THE PROFESSIONAL SCIENCE TEACHER, WHO USUALLY HAS PRIMARY RESPONSIBILITY FOR ORGANIZING AND IMPLEMENTING INSTRUCTION. THE PARTICULAR SPECIALIZATION OF EACH MEMBER OF THE TEAM MUST BE TAKEN INTO ACCOUNT IN PLANNING AND UTILIZED IN INSTRUCTION. THE AUTHOR BELIEVES THAT TEACHERS AND STUDENTS BOTH BENEFIT FROM TEAM TEACHING. (ER)

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PLAN AND ORGANIZE TEAM TEACHING

in elementary school science

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INTRODUCTION

A recent study by the Bureau of Social Science Research[1] found that the vast majority of school systems surveyed had no familiarity or experience with results of research and development related to a group of new educational practices which included team teaching. In addition, results of an earlier Gallup poll[2] indicated that, among a representative sample of parents of school-age children in the United States, 84 percent preferred team teaching to other organization patterns in the schools. As science teachers, we find this very interesting and somewhat surprising. Our first reaction may be one of questioning the statistical treatment of the evidence, circumstances precipitating the poll, or procedures by which the parents queried defined the term, "team teaching." But, regardless of such considerations, there is little reason to doubt the authenticity or reliability of the poll. Even at face value, it is certainly worthy of comment that parents are favoring a teaching procedure that has been widely publicized in current educational literature, but which, nevertheless, is practiced by relatively few teachers.

Perhaps more teachers are not involved in team teaching simply because they lack the specific and practical help necessary for implementing the methods of team teaching in the classroom. The practical suggestions in the following pages may help those teachers in initiating a program of team teaching in science.

But in order to determine how best to plan and organize team teaching, we must first consider such items as: (1) the content or discipline which is science, (2) the needs of the students or learners, (3) the capabilities of the teachers, (4) the methods of team teaching, and (5) the outcomes expected of students in terms of changed behaviors and knowledge of science.

Problems of Teaching Science

Blough and Schwartz[3] have defined science as a body of information and principles that help the individual to understand the world around him. This body of information includes knowledge about phenomena ranging from atoms to stars, from microscopic water life to man. Still another definition offered by Blough and Schwartz views science as the methods of discovery by which new information is uncovered, by which new principles are arrived at, and by which old principles are modified or discarded.

Navarra and Zafforoni[4] have viewed science as man's attempt to interpret, control, and live effectively in his own environment. They have identified four purposes necessary for the development of scientific knowledge in students. These are: (1) the development of functional information, (2) the development of instrumental skills, (3) the understanding of the scientific methods, and (4) the development of a scientific attitude.

But, however we define it, science is a complex, highly structured, ever-changing discipline. The study of science is complex. Many areas of

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[1] *Education U.S.A.* National School Public Relations Association, Washington, D.C. August 1, 1969.

[2] *Administrators' & Teachers' Reactions to Educational Innovations.* An IDEA Report. Gallup International, Inc., Princeton, New Jersey. May 1967. p. 27.

[3] Blough, Glenn O., and Schwartz, Julius. *Elementary School Science and How to Teach It.* Holt, Rinehart and Winston, New York. 1964. p. 6.

[4] Navarra, John Gabriel, and Zafforoni, Joseph. *Science Today for the Elementary School Teacher.* Harper and Row, Publishers, Evanston, Illinois. 1963. pp. 17-18.

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knowledge are encompassed by the term "science." Because science is both a discipline and a process, teachers of science face a dual task as they teach boys and girls to understand man and his environment.

In this time of great change, when the body of science knowledge is doubling and tripling at phenomenal rates, it is necessary not only to teach an understanding of the environment, but also to prepare the student for change in his environment. Many of the facts taught ten years ago are now obsolete, and many theories of a decade ago have been superseded as a result of new knowledge. It is the science teacher's responsibility, then, to acquaint the student with the important processes and conceptual schemes[5] of science which have survival value and to help him keep his mind open to new observations.

Most teachers of science have recognized that no one person can have complete knowledge of science and its separate disciplines, nor of science as a method, and that these limitations present some very real problems in teaching science. Thus team teaching offers at least a partial solution to these problems, since several teachers with various specializations in science may be able to offer the students a better understanding of man and of his environment than can one teacher with one group of interests and capabilities.

The Need for Change

Team teaching can be practiced in either self-contained or departmentalized classrooms, whether grouping is homogeneous or heterogeneous, and in nongraded schools as well. The basic prerequisite for the successful initiation of team teaching is not classroom organization, but rather a realization by the teachers that, despite their good intentions, excellent educations, the science materials available, and the interest of the boys and girls, the present program is not the best possible. If each teacher is seeking a better way to teach science than he has formerly used, team teaching can, and should, be considered.

The Science Program

The administrators and supervisors of most schools usually involve the science teachers in selection of the science program that they will be teaching. Although the science curriculum varies from school to school,[6] there are some universal patterns which are clearly identifiable. These patterns include: (1) the textbook approach; (2) the textbook approach combined with active engagement of students in science experiments, demonstrations, and manipulation of equipment; (3) the science unit approach in which teachers write their own or use units prepared by the teachers and supervisors in their own or another school system; or (4) the incidental approach, whereby teaching focuses on what students bring into the classroom, such as insects, leaves, rocks, and other objects from their environment.

In each of these approaches, some teachers are capable of teaching the children the content

[5]NSTA Curriculum Committee and the Conference on Science Concepts. *Theory Into Action in Science Curriculum Development.* National Science Teachers Association, Washington, D.C. 1964.

[6]York, L. Jean. *Science In-Service Education Practices in the Capital Cities of the United States.* Paper presented at the National Science Teachers Association Sixteenth Annual Convention, Washington, D.C., April 1, 1968. (Convention program title, "A 1967-68 Study of In-Service Science Programs for the Teachers in the Elementary School.")

and process of science, and other teachers are not. Some teachers are unsure about teaching science because they have not had sufficient preservice education in science. The children ask questions that the teachers cannot answer: "What keeps an airplane up?" "How come the birds go south in the winter?" "How come you can't drill a well and get water in the hills?" "How does television work?" "How can electricity go through those wires?" "What makes the sealed can collapse after it has been heated?"

Other teachers fear teaching science because the science equipment or animals cause anxiety about (their own) safety: "Wiring the batteries might give me a shock." "I am scared to death of snakes and mice." "When I set up an experiment, it usually fails." "I get poison ivy every time I take the kids on a field trip in the woods." A teacher may even think: "The kids know more about science than I do."

These concerns are understandable, and once they are identified, they may easily be alleviated. Through team teaching several teachers can pool their capabilities and share responsibility for planning, teaching, and evaluating the instruction of a given number of children.

HOW TO BEGIN

Many team teaching situations have resulted from an informal exchange of ideas among teachers who decide that they can help students more efficiently by utilizing a team organization. In this situation, individual team members outline the educational tasks they will complete and make a schedule that will allow for the new practices to take place.

Administrators are usually consulted as the team begins to ponder the concept. The principal and superintendent assist with the scheduling, hiring of additional personnel, arranging for changes in physical resources, and communicating with the parents.

In some schools a team teaching project originates with the principal or superintendent; then the planning sequence is reversed. But in either situation, teachers and administrators must work together to provide better utilization of teachers, physical resources, and educational media to improve instruction.

Team Membership

A science teaching team may consist of a variety of professional and nonprofessional personnel. In general, the science teachers are responsible for the actual teaching, inasmuch as they are professionally trained and certified to carry out this task. The professional science teachers, then, have primary membership on the teaching team. Principals, science supervisors, and consultants may serve as team consultants but as resource personnel, they play a secondary role in team teaching.

Teams vary in structure, depending on the philosophy of the school district. Some schools prefer a hierarchical kind of team where titles such as "master teacher," "teacher specialist," and "regular teacher" are used. The master teacher is one who has advanced training and experience and is capable of doing a superior teaching job. The teaching specialist may have a competence in one particular field, such as training or experience with a particular science program or teaching device. Regular teachers have the general professional training and background necessary for understanding children and teaching science.

Nonprofessional personnel (sometimes called auxiliary personnel or paraprofessionals) can also be a part of the team. Nonprofessional personnel

Planning sessions provide for sharing of ideas and the development of professional companionship among the team members.

are the nonteaching members who may be student teachers, teachers' aides, or clerks who are assigned to the team to complete specific tasks.

These teachers' aides and secretarial members assume whatever duties their training has prepared them for – taking notes at planning sessions, typing reports and tests, correcting objective tests, making transparencies and charts, setting up files for each student, and communicating information to members of the team. The student teacher or intern is not certified, but has completed most college courses and requirements. With special direction and supervision from the science teachers, the intern may assume some teaching tasks.

A PLANNING SESSION

An illustration of the team in action might be the following: The fourth-grade teachers in an elementary school would meet together at a convenient time one day each week for planning. During these sessions, the members could discuss their individual ideas for teaching specific knowledge, understandings, and skills of science related to the next week's work. They could also share their ideas for student participation in science activities and for the utilization of innovative materials.

In making the instructional plan, the team members should answer these questions: What are the objectives and goals going to be? What understandings and skills will be taught? What instructional materials will be utilized by each teacher with his group? What schedule will prevail in the use of these materials? What schedule will prevail if large groups are to be convened or students are to meet with a specific teacher to meet their needs? How will each objective be evaluated? How will the evaluation be shared with the students? How will the evaluation of understandings, skills, and attitudes be recorded on the students' records? How will students' particular intellectual, physical, social, and psychological needs be met? How will the science instruction be related to the language arts, mathematics, social studies, music, and art to attain a balanced, integrated curriculum?

A team discussion might focus on a particular topic for classroom study, such as the surface of the earth or moon. Teachers could first discuss the concepts and generalizations listed in the teachers' manuals or the curriculum guides. Following this discussion, the teachers could consider a variety of methods for presenting these facts in an interesting and exciting way to the boys and girls.

Specialization

Because learning is a unique and individual process for each student, any instructional strategies available should be utilized by the team of teachers. Motion pictures and filmstrips can be selected by the teacher who enjoys working with audiovisual

Learning is more enjoyable when children are stimulated by having a variety of instructors.

equipment. These motion pictures or filmstrips can be shown to large groups of students and then, since a large group is inappropriate for discussion, the individual teachers could conduct the post-session teaching in their own classrooms where the students could react and discuss the motion picture or filmstrip.

One teacher might have had special courses in geology as part of preservice or postgraduate work. This teacher could lecture to a large group on the topic of rocks and minerals on the moon or the earth's surface, and perhaps make available collections of rocks, minerals, or fossils which the children could learn to identify and classify.

Another teacher in the group might enjoy the outdoors and be interested in ecology and nature studies. This teacher could supervise a one-day or overnight field trip to an area where the children could observe specific kinds of rocks, fossils, soil erosion patterns, and plant life. While on the field trip, the other teachers might plan related activities for the children, such as singing around the campfire, making castings of animal tracks, making tempera paint spatterings of plant leaves, or working on the banks of a creek with clay. Other teaching activities that could be shared are experiences in measuring the height of a tree from the length of the shadow, learning to use a compass and following a compass trail through the woods, and identifying poisonous and nonpoisonous plants, or those that are seen so infrequently that they are protected by law. Someone would need to supervise details such as transportation, getting permission slips from the parents, planning and cooking the food, planning and supervising the sleeping arrangements, and providing for first aid in the event of snake bite, contact with poison ivy, or minor injuries.

After the field trip, team teaching of science could resume in the classroom with further study of observations made outdoors. The teacher most interested or best trained in the area of science experiments might supervise the planning and preparation of activities for the students. Another teacher might demonstrate the principle of the volcano in a large group for instruction. Those teachers less comfortable with scientific methods might work with the children on experiments in small groups, utilizing simpler demonstrations, such as the principle of settling when rock and soil

The flexibility of group size provides greater opportunity for individual learning or tutoring.

are in a water solution. These teachers could also supervise student activities where boys and girls are classifying rocks and leaves, using the skills and information gained by observing one of their peers teach this skill to the children on the field trip. All teachers could conduct related activities in their own classrooms, through such projects as murals or scrapbooks, or by inspiring the children to write creatively about their field trip experiences.

Advantages of Team Teaching

Robert H. Anderson[7] has described team teaching as three or more teachers who plan together for learning experiences for a common group of students, carry out the plan, and then evaluate educational experiences. As a team of teachers work together in this manner, several advantages

[7]Goodlad, John, and Anderson, Robert H. *The Nongraded Elementary School.* Harcourt, Brace and World, New York. 1963.

should accrue: The teachers: (1) are intellectually stimulated by working and planning together; (2) learn content and methodology from one another; (3) are free to concentrate on their areas of special strength or interest in science, instead of teaching all areas; (4) may adjust the size of the instructional group from day to day, in accordance with their educational goals; and (5) may transfer a student to another instructor if there is a rational reason, such as a personality conflict between teacher and student.

The students also benefit from a team teaching organization in science. For example, most students: (1) are stimulated by having a variety of instructors; (2) learn more from a teacher who is really interested and knowledgeable about his topic; (3) feel less pressure for grades when class work is evaluated by more than one teacher; (4) enjoy the freedom of movement associated with regrouping for instruction; and (5) enjoy the innovative materials and methods associated with team teaching.

Flexibility

Team teaching always involves at least two teachers working together in a process of planning and evaluating the educational experiences of a given group of children, but the team itself sometimes consists of five or six teachers. The students shared by the team may vary in number from 40 to 180, and grade levels may be spanned.

Although team teaching usually involves the grouping of students for specific learning tasks, these tasks themselves may vary. Students may attend a lecture or speech, view a film, react in a small group, work on an experiment or in a lab, or be involved in individual learning or tutoring.

The size of the group which is ideally suited to a specific learning task will vary with that task so that, in the team teaching procedure, group size is usually not constant all day, but is flexible. And, in addition to the number of students in the group, the composition of the group and the length of the group session may also vary from day to day.

Another element of team teaching which allows for variation is that each teacher assumes responsibility for keeping abreast of developments in only one or two aspects of the content in one area. For example, one member of the team might take responsibility for developments in the science curriculum in the area of biology; another might read and study in the area of earth science. In elementary schools, too, team teachers can share responsibilities. One teacher might do the greatest amount of work on living things, and another might take responsibility for work on conservation of resources. A third teacher might work with demonstrations, experiments, field trips, or the collection of science materials.

In summary, team-teaching involves a group of teachers with diverse capabilities who share an expanded number of students and who work toward the goal of providing a higher quality of learning experiences through the use of such methods as diagnosis of individual student needs and interests, and planning, teaching, and evaluating the curriculum in light of these needs and interests.

SPECIAL CONSIDERATIONS

In initiating a team teaching program, there are several potential problems which those from a more conventional teaching system may fail to recognize, but these pitfalls can be avoided. Keep in mind that:

1. Team teaching requires additional planning time because discussion and problem solving in a group require more time. But remember, better ideas and probably better plans will result than would be the case with one teacher working alone. Several extra hours per week should be allotted for team meetings, and such planning is most effective when scheduled during the regular school day, rather than after school, when teachers have already put in a full day of work.
2. Team teaching is not an organizational pattern favored by all teachers, for it may require compromises of personal opinion on matters of curriculum, teaching procedures, and diagnosis of students' needs. Transfers should be permitted, and perhaps encouraged, for teachers who work more effectively in the more autonomous classroom situation.
3. The new programs and teaching devices sometimes constitute stumbling blocks; implementation is only effective when all personnel have had inservice education with the new programs and new materials.

4. Diagnosis of students' needs should include discussion of personal needs, as well as academic ones. Because some teachers derive emotional satisfaction from working with a particular group of students, they may find it difficult to share responsibility for a greater number. The team leader should emphasize that each teacher is still important to the students, but, in team teaching, is important to a larger group in a more specialized way.
5. Evaluation practices sometimes are not changed as team teaching is effected. But the old report card cannot be used effectively by a team, and new evaluation practices should be designed prior to the reporting period. The new evaluation practices should include an opportunity for the teachers and individual students to communicate, question, and discuss the student's progress toward the established goals. Likewise, the team should schedule parent-teacher conferences.

Essential to good team teaching are mutual respect among the teachers involved and willingness on the part of each to spend additional time with the team planning and carrying out an improved program. Working together involves a commitment to listen to the viewpoints of others; to share and suggest alternate ways of solving problems; to change a personal way of thinking when necessary; and to accept constructive criticism on occasion. Because most teachers are not accustomed to working in this way, the process can be frustrating – or it can be exhilarating. The probable advantages are of such magnitude, both to teachers and students, however, that temporary difficulties of adjustment are of secondary importance.

The outcomes of team teaching in science can be no better than the teaching strategy shared by teachers as they plan, teach, and evaluate specific lessons for a given group of students. If the group has little sense of direction, lacks concern with global and behavioral objectives of science, or makes unimaginative use of instructional materials, the outcomes will be less than optimum. Not much will be gained, either, if the team members are unwilling to assume new roles as teachers.

BENEFITS TO TEACHERS AND STUDENTS

Teachers benefit from team teaching because they learn from one another in an informal give-and-take situation and from watching each other teach. Many have indicated that they prefer to receive help in improving their teaching from other teachers who are teaching at the same grade level and who share common problems.[8] Thus, team teaching provides the security for productive inservice training which many teachers find desirable.

Principals and supervisors find that team teaching offers an appropriate medium for assisting the beginning teacher to become acquainted with the school system and its policies.[9]

Team teaching also provides teachers with a professional fellowship offering opportunities for intellectualizing with adults. Friendships emerging from team teaching are shared in and out of school.[10]

Students will benefit from receiving the superior instruction possible through good team teaching. As each teacher teaches or supervises the area of his greatest training or interest, the science program is improved.

In addition, personality conflicts between teachers and students can be minimized as the student works with several teachers during the school day or week. A recent study by Gallessich and Schmidt[11] reports that first-grade students experience less anxiety in a team teaching situation than in a self-contained classroom.

Students can also benefit from the wider range of innovative instructional materials used by a group of teachers seeking to utilize improved educational technology.

When teachers carefully plan a science curriculum to meet the intellectual, physical, emotional, and social needs of the individual, the student has a greater chance for scholastic success and a greater chance for developing a positive self-concept. Few students drop out of school who enjoy learning and who find school a place for self-realization. Team teaching is no panacea; it offers a vehicle, however, for teacher cooperation in designing a science curriculum which will meet the needs of boys and girls who will be the adults of tomorrow.

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[8]York, L. Jean (Netcher). *Relationships Between Problems of Beginning Elementary Teachers, Their Personal Characteristics and Their Preferences for In-Service Education.* Unpublished doctoral dissertation, Indiana University, Bloomington. 1967.

[9]York, L. Jean. *Problems of Beginning Teachers.* Unpublished study, Austin Independent School District, Austin, Texas. 1968.

[10]From a book currently being completed on team teaching, edited by June Gallessich and Ira Iscoe, The University of Texas at Austin.

[11]*Ibid.*

BIBLIOGRAPHY

1. Bair, Medill, and Woodward, Richard G. *Team Teaching in Action.* Houghton Mifflin Company, Boston, Massachusetts. 1964.

2. Beggs, David W., Editor. *Team Teaching; Bold New Venture.* Unified College Press, Indianapolis, Indiana. 1964.

3. Educational Research Council of Greater Cleveland. *Team Teaching, A Selected Annotated Bibliography.* Staff Utilization Project. Educational Research Council of Greater Cleveland, Cleveland, Ohio. 1967.

4. Joyce, Bruce R. *The Teacher and His Staff – Man, Media, and Machine.* National Education Association, Washington, D. C. 1967.

5. Lobb, M. Delbert. *Practical Aspects of Team Teaching.* Fearon Publishers, Palo Alto, California. 1964. # pp. 16-21.

6. Peterson, Carl H. *Effective Team Teaching – The Easton Area High School Program.* Parker Publishing Company, Inc., West Nyack, New York. 1966.

7. Polos, Nicholas C. *The Dynamics of Team Teaching.* William C. Brown, Dubuque, Iowa. 1965.

8. Shaplin, Judson T., and Olds, Henry F., Jr., Editors. *Team Teaching.* Harper and Row, Publishers, New York. 1964.

9. *Team Teaching in Elementary Grades.* Educational Research Service Circular No. 9. National Education Association, Washington, D. C. 1965.

10. Wall, Harvey R., and Reasoner, Robert W. *Team Teaching, A Descriptive and Evaluative Study of a Program for the Elementary Grades.* Mt. Diablo Unified School District, Concord, California. 1962.

11. York, L. Jean. *Team Teaching: Implications of Research for the Public Schools.* Research and Development Center for Teacher Education, The University of Texas at Austin. 1969. (USOE Grant 6-10-108) (This is a chapter from the book edited by Gallessich and Iscoe that was mentioned in Footnote 10.)

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